USDA Foreign Agricultural Service
GAIN Report
Global Agricultural Information Network

Required Report - public distribution

Date: 6/9/2015

GAIN Report Number: H15002

Hungary

Agricultural Biotechnology Annual

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Report Highlights:
Hungary is one of the strongest opponents of agricultural biotechnology in the European Union. The country promotes its position of providing opportunities from its regional and European position to initiate a joint alliance for genetically engineered (GE)-free agriculture in Europe, for GE-free crops, livestock and food production and feeding.

Section I. Executive Summary:

Hungary does not produce any GE crops or animals and cloned livestock. The country is an active opponent of agricultural biotechnology in the European Union. Hungary wants to be the first EU country which adopts a law directly banning the cultivation of GE plants. There is also a legislation work to introduce a "non-GMO" label which is believed to provide better market position for domestic products. The international negotiations on the Transatlantic Trade and Investment Partnership (T-TIP) put Hungary's national policy against the cultivation and use of GE crops at the center of public attention. In this question, Hungary effectively exploits its regional, Central European or European role as an EU and V4 (Visegrad Group) member state. Officials are propagandizing their initiative for GE-free crop, livestock and food production and feeding, and for a joint alliance of EU member states for the GE-free agriculture in Europe. It is an announced governmental effort to achieve and maintain GE-free milk, meat and egg production in Hungary. Nevertheless, there are no real alternatives for GE soybeans as protein sources in feeding at present. That is why Hungary's soybean import dependence led to strong political intentions to reduce the exposure of the livestock sector to imports and the world market price with the help of production supports and increasing of soybean growing areas.

Section II. Agricultural Biotechnology in Hungary

CHAPTER 1: PLANT BIOTECHNOLOGY

PART A: PRODUCTION AND TRADE

a) PRODUCT DEVELOPMENT

Over the past 15 years, more than 70 biotechnology companies were founded in Hungary. Most of them were registered in the last five years. In particular, significant results were achieved in nanotechnology, molecular chemistry and biotechnology services, mainly in red (medical) biotechnology. Regarding green (agricultural) biotechnology, there is no information that any kind of GE plants are under development in the country to be commercialized in the next couple of years. This is due to the anti-GE policy of the Hungarian Government and the "de facto" ban on GE cultivation.

Basic research is mostly carried out by research institutes and universities to enhance plant resistance against viruses and other pathogens (e.g. studies on artificial micro-interference RNA [miRNA]-mediated virus resistance and virus resistance induction, a new breeding technique, not currently considered GE by the EU). Achievable results with the traditional breeding techniques are limited, less predictable and sometimes more expensive. For example, using traditional breeding techniques, developing a new vegetable variety takes 12-16 years. Developing a new pesticide (active substance) requires 10-12 years and costs about USD $250 million. Therefore, developer companies have to balance whether GE or traditional chemicals is the way to search for solutions against pests and the competing weeds. There is research on miRNAs controlling fruit and seed developments as well. In the recent years, researchers have given more attention to environmental, and food and feed safety studies (e.g. "starter" microbe selections for specific properties, bio-analysis based method developments with special regards to food safety and quality control).

b) COMMERCIAL PRODUCTION

No biotechnology crop varieties are produced in Hungary. Hungary's interests were fulfilled when a vote passed in the European Parliament allowed individual member states to ban the cultivation of GE

crops. "It is an especially important strategic interest for Hungary, laid down in its constitution, to ensure that its agriculture is GMO-free", the Ministry of Agriculture stated. During the talks, which lasted over four years in the EU, Hungary was always urging a measure which would ensure an effective tool for imposing a ban on GE products. If it were not banned in Hungary, corn would be the most likely crop cultivated for the use of GE technology. At the same time, the Ministry of Agricultural stated clearly that Hungary represented a firm zero tolerance policy against GE crop production (Meetings of the Convention on Biological Diversity, September 29 - October 17, 2014, Pyeongchang, South Korea).

c) EXPORTS
Hungary does not export GE crops. Politicians and a part of the agriculture producers view Hungary's GE-free status as a marketing advantage. This is because other EU countries are the primary destination for planting seed and grain exports.

d) IMPORTS
The import of biotech crops can be considered controversial in terms of Hungary's GE-free status. Like most other European countries, Hungary has a structural shortage of protein for animal feed. To meet demands, Hungary imports large quantities of soybeans. Hungarian livestock uses 500-700 thousand tons of soybean meal annually, according to the official data. However, the amount of soybean demand may reach 900 thousand tons per year, including 700 thousand tons of imported soymeal and 100 thousand tons of imported soybeans. Only 10 percent of the Hungarian soymeal consumption derives from domestic sources. The other 90 percent is imported from Brazil and Argentina as re-exported shipments from EU countries, mainly from Slovenia, Germany, the Netherlands and Italy. It makes farmers and feed producers vulnerable to the external market movements.

According to estimates since about 90 percent of the imported soybeans are GE, their replacement with conventional, non-GE varieties, would result in and extra cost of HUF 8 billion (USD 29 million).

e) FOOD AID RECIPIENT COUNTRIES
Hungary is not a food aid recipient country.

PART B: POLICY

a) REGULATORY FRAMEWORK
On April 25, 2011, Hungary adopted a new constitution, which entered into force on January 1, 2012. The following part of the document relates to GE crops:

"Constitution, Chapter 'Freedom and Responsibility' Article XX (1) All have the right to physical and spiritual health. (2) Hungary promotes the realization of the rights as stated in paragraph (1) by operating an agriculture free of genetically modified organisms, by providing access to healthy food and drinking water, by organizing labor safety and health care, by subsidizing sports and regular physical training and by ensuring protection of the environment."

The Ministry of Agriculture takes the lead regulating GE cultivation, importation and processing of GE into food or feed. The National Food Chain Safety Office (NFCSO) is the top government organization

handling the technical aspects of GE crops such as inspection, testing and registering plant varieties etc. However, the Ministry of Agriculture makes the decisions.

The main piece of the related legislation is the Act No. XXVII of 1998 on Biotechnology Activities. It was amended several times in order to harmonize with the EU and update the rules on coexistence. The goal was to prevent the unregulated entry of new GE plant varieties into production. The Act gives expanded powers to environmental, agricultural and industrial biotechnology authorities and mandates GE variety owners to cooperate with them.

For direct consumption of imported food and feed containing GE materials, the Act orders the use of legal and administrative procedures corresponding to the EU rather than requiring additional tests.

Terms and obligations regarding GE crops, set forth in the Constitution and the Act on Biotechnology, are highlighted by the Act No. C of 2012 on the Penal Code. This law considers the violation of GE related rules as a crime against the system and order of public administration. The State Secretary for environmental affairs stated that since the European Union member states are now legally allowed to restrict or prohibit the cultivation of GE crops, Hungary wants to be the first EU country which adopts a law directly banning the growing of GE plants.. The Minister of Agriculture said on May 20, 2015 that he would submit a bill to the National Assembly to let Hungary be the first EU country where the GE-free status is guaranteed by laws. The small opposition party (LMP) used the minister's initiative to promote their own position. According to this, the only solution for having a GE-free Hungary would be a complete EU-wide ban on GE crops and a veto on the free trade agreements with Canada and the United States. According to them, these agreements threaten the country's GE-free status.

Besides the above mentioned legislative work, Hungary's soybean import dependence also led to strong governmental and political intentions to make such measures that would reduce the exposure of the livestock sector to the world market price and the dollar exchange rate fluctuation. On this basis, the Ministry of Agriculture is working on the launch of the National Soybean Program. The goal of this initiative is to reduce the rate of import and the use of GE soybeans and soymeal in feeding. According to the Parliamentary State Secretary of the Agricultural Ministry, the implementation of this objective is supported by the EU's Common Agricultural Policy. Soybean producers could get about EUR 200 extra support per hectare annually over the single area payments.

b) APPROVALS

Although the approvals are formally made by the Ministry of Agriculture, a Biotechnology Body evaluates the applications for biotech activities and products (new varieties, genes, etc.) in Hungary. Members of the Biotechnology Body are nominated by the Hungarian Academy of Sciences, Ministries and non-governmental organizations. Civil servants, public officers (government employees) are not members of this body. Ministries typically nominate scientists or experts from 'think tanks' belonging to their institutes.

Database of the "GMO" plants released for experimental purpose in Hungary is located at http://biosafety.abc.hu/databases.php

c) FIELD TESTING

Due to the domestic operative rules on GE crops, a limited number of field experiments were approved in Hungary. Tests were mainly conducted in maize and in some cases in tobacco, potato, sugar beet, wheat or barley only with scientific purposes, without commercialization. Since 2012, new GE plant field test has not been approved according to the official database.

d) STACKED EVENT APPROVALS
Hungary follows the European Food Safety Authority (EFSA) guidelines and EU's common legislation concerning stacked events (Regulation of the European Parliament and of the Council No. 1829/2003, Commission Regulation No. 1981/2006, Commission Implementing Regulation No. 120/2014).

e) ADDITIONAL REQUIREMENTS: none

f) COEXISTENCE
The Hungarian Government approved its Coexistence Regulation on November 23, 2006 (see report HU6015) by the amendment of the Act No. XXVII of 1998 on Gene Technology Activities. Chapter III of the Act and the Decree No. 82/2003. (VII. 16.) of the Ministry of Agriculture and Rural Development (on the order of registering and supplying data as well as on the documentation which shall be enclosed in the notification regarding the gene technological activity) prescribed the common rules of the coexistence for organic, conventional and genetically engineered crop using systems. These rules determine all the conditions that are designed to prevent the uncontrolled spread of GE crops and their crossing or mixing with non-GE products. In this regard, the range of measures is quite broad. Among them, keeping buffer distance to avoid crossover with pollen drift, careful cleaning of machineries and separated storage of crops are especially highlighted. All in all, the concerning regulations imposed a "de facto" ban on biotech production partly due to the neighbor consent requirements and the excessive (400 meters) isolation distances.

g) LABELING
Hungary follows EU labeling standards. A number of GE soy and corn varieties are approved for industrial food use and as feed in the European Union and in Hungary as well. If GE content above 0.9 percent, it must be indicated on labels. At the same time, it is not required to be indicated on the label if products derive from GE crop feed animals.

There is a legislation work to introduce a "non-GMO" label. Being discussed is that meat, milk and eggs labelled as non-GE products must not derive from such animals that were fed with any kinds of GE feed. The Ministry of Agriculture indicated that consumers need and are looking for healthy, non-GE food and the new label is going to meet their demand. It is believed that products bearing the "non-GMO" label will be easier to sell because of the better market position.

h) TRADE BARRIERS
The most sensitive agriculture question for Hungary is GE products. One of Hungary's main concerns with the Transatlantic Trade and Investment Partnership is the U.S. agricultural exports and the status of GE food. Hungary's Basic Law (constitution) practically bans GE crop growing, and the Government is unwilling to allow any GE plant seeds into the country. This is a major political issue and all parties in Hungary hold a strong anti-GE position.

Hungary has used the Safeguard Clause (under Directive EC No. 2001/18) in banning the production of MON 810 corn events since 2005, and the cultivation and feeding of *Amphlora* potato variety since 2010. The country is getting less open for compromise at negotiations on "technical solutions" (the level of non-approved GE presence) for feed and food, and its standpoint concerning GE planting seeds (plant genetics) is always a zero tolerance.

i) INTELLECTUAL PROPERTY RIGHTS

Hungary does not commercially plant GE crops. There is no specialized intellectual property legislation for GE products. In general terms, the country is against the patents on genetic materials.
Application for national plant variety protection can be filed with the Hungarian Intellectual Property Office, while the application for EU plant variety right can be submitted directly in the Community Plant Variety Office (CPVO).

Hungary is an active participant of negotiations under the International Union for the Protection of New Varieties of Plants (UPOV) and the country was accessed to the International Convention for the Protection of New Varieties of Plants on January 1, 2003.

j) CARTAGENA PROTOCOL RATIFICATION

The Hungarian Parliament ratified the Protocol on January 13, 2004. The ratification was promulgated by the Act No. CIX of 2004 (on the publication of the Cartagena Protocol on Biosafety signed in 24 May 2000 in Nairobi) and came into force on April 12, 2004. Article 27 of the Cartagena Protocol gives the Conference of Parties a mandate to begin the development of international regulations regarding liability for damages resulted by the trans boundary movement of living modified organisms and the legal redress. On October 16, 2010, the 160 party states to the Cartagena Protocol unanimously adopted the so-called Nagoya-Kuala Lumpur Supplementary Protocol on Liability and Redress to the Cartagena Protocol. In 2011, declaration of the political commitment to the Supplementary Protocol signed on behalf of Hungary and the European Union by the Hungarian Minister of Agriculture was published as a great diplomatic success of the Hungarian EU Presidency. The publication of the Nagoya-Kuala Lumpur Supplementary Protocol on Liability and Redress to the Cartagena Protocol on Biosafety was by the Act No. CLXXI of 2013 in Hungary.

In respect of the Convention on Biological Diversity (CBD), the Hungarian Government adopted a new National Biodiversity Strategy 2014-2020 (NBS) in February 2014. In order to comply with the Aichi Targets, the new NBS contains highlighted objectives such as the application of precautionary principle of releasing GE organisms into the environment to eliminate harmful effects on biological diversity (see the CBD fifth national report). The NBS characterizes Hungary's biodiversity with Strengths/Weaknesses/Opportunities/Threats analysis. The constitutionally protected GE-free agriculture is mentioned among the *strengths*. The incidence of GE traits in non-GE seed lots in the domestic market and the fact that MON 810 GE corn can be grown on the other side of almost 50% of the Hungarian border (in Slovakia and Romania) are considered as *weaknesses*. It is mentioned as an *opportunity* to develop a common regional policy and GE-free strategy with the neighboring countries. Loosing Hungary's GE-free status is regarded as a *threat* against the national interests.

Hungary's National Biodiversity Strategy sets out the following measures needed between 2014 and 2020:

- Social, economic and environmental studies to provide firm basis for banning GE crop

cultivation.
- Enhanced control and monitoring of presence of GE traits on arable lands along the border of Hungary,
- Setting up diplomatic agreements with neighboring countries to maintain the GE-free status of Hungary's border areas,
- Intensified control of gene technology activities,
- Domestic environmental and health impact assessments on genetically modified organisms being under EU authorization.

Due to the specific environmental features of the Pannonian biogeographic region, Hungary argued the validity of risk assessment which takes the ecosystems of only other EU member states into consideration. Therefore, the country requires further environmental impact assessments both on the approved GE crops and on those that are in the authorization process.

Hungary's National Rural Development Strategy 2012-2020 (NRDS) aims to reverse the "unfavorable processes" in the countryside. The NRDS defines objectives and principles of Hungary's rural development policy as well as provides a framework for the implementation of relevant programs and measures. The NRDS specifically deals with biodiversity, conservation and the preservation of Hungary's GE-free status.

k) INTERNATIONAL TREATIES/FORA

Hungary is an active member of different intergovernmental and standard setting international organizations (FAO IPPC, EPPO, OECD, WTO, Codex Alimentarius etc.). Taking part in their work, the country is a vocal opponent of GE crops and enforces its point both at EU and regional levels.

Hungary tries to effectively apply opportunities which derive from its regional, Central European or European role as an EU and V4 (Visegrad Group) member. Hungary's national policy is against the cultivation and use of GE crops and loudly states this position in the Central European region and all over the EU to exploit the international attention on the Transatlantic Trade and Investment Partnership. Governmental officials are propagandizing their initiative for GE-free crops, livestock and food production and feeding in Europe.

In January 2015, Hungarian Minister of Agriculture said on the sidelines of the Global Forum for Food and Agriculture in Berlin that Hungary would initiate a joint alliance of EU member states rejecting the use of GE organisms in farming with the aim to make the entire European Union free from GE crops. He added that the countries which are committed to GE-free farming must forge the alliance.

On April 20, 2015, at the meeting of Agriculture Ministers in Luxembourg, the Hungarian Minister of Agriculture continued to negotiate for the initiative with his Luxembourg, Slovenian and Bulgarian counterparts. The Ministers agreed on the necessity of a production ban on GE crops, while GE-free feed has to be available for livestock, according to the Hungarian and Slovenian Ministers.

On April 14-15, 2015, the Hungarian Minister of Agriculture attended an informal meeting of the EU Environment Ministers in Riga, on the invitation of the Latvian Presidency of the Council of the European Union. The Ministers discussed current issues relating to the preservation of biological diversity, and on the side-lines of the meeting, the Hungarian Minister continued the high-level talks in

the interests of the initiative for GE-free Europe. According to his points, maintaining the GE-free status is important throughout the European countries to preserve biodiversity and protect traditional species. This objective, which is set down in Hungary's constitution, was put forward at European level, and the Hungarian Minister of Agriculture also held several bilateral talks at the trade show of "Green Week" in Berlin (January, 2015) to gain support for this. The Environment Ministers of Poland and Slovenia welcomed the Hungarian endeavor and indicated that (in harmony with the Hungarian initiative) they would not be authorizing the cultivation of any kind of GE crops and were ready to work together with Hungary to achieve the mentioned goal at European level.

l) RELATED ISSUES

On the subject of the transatlantic free trade agreement, the Hungarian Minister for Foreign Affairs and Trade said this could be one of the key documents of global trade and thus talks require due thoroughness and a peace of mind as well as transparency. He noted that Hungary's GE-free status was set down in its constitution and the Government had no leeway to negotiate in this aspect.

On April 17, 2015, the U.S. Ambassador to Hungary had a bilateral talk with the Hungarian Agriculture Minister. The Ambassador and the Minister agreed on that the free trade agreement could be good for Hungary, but the Minister expressed his reservations as well. He said further consultations were necessary on certain questions such as the preservation of GE crop exemption and the geographical indications. After the meeting, the opposition Party LMP stated in the media that most people would be worse off with T-TIP, as social disparities would increase, while the environment and the quality of food would deteriorate.

On April 16-17, 2015 an international conference entitled, "How to maintain GMO-free agriculture in Europe" was organized by the Hungarian Ministry of Agriculture. The first day of the conference addressed the diverse aspects and characteristics of different GE-free labelling schemes. In the course of its second day, socio-economic considerations were discussed not only among the Member States of the European Union (Germany, Austria, France, Luxemburg), but also among other countries in Europe (Russia, Switzerland, Moldova, Norway) who believed that socio-economic aspects could be relevant deciding on the authorization of GE varieties. The conference appeared as the next step of the initiative entitled "Alliance for a GMO-free Europe" which was launched by the Hungarian Minister of Agriculture on the occasion of the ministerial summit at "Green Week" (Grüne Woche) international trade show in Berlin in January 2015.

Hungarian officials highlighted that the cooperation among the European countries in GE-free questions may also play a significant role in different sub-sectors. For example, providing livestock production with non-GE feed became a governmental priority in Hungary. That is why the Government supports the increase of Hungary's soybean growing area from the current 40-45 thousand hectares (ha) to 120 thousand ha. Thus, Hungary joined to the "Danube Soya" (Donau Soja) program, which is a cooperation agreement and was signed on January 22, 2013 by the country. The Austrian born cooperation initiative, covering Central European countries, is to incite the region's non-GE production and reduce the large-scale dependence on soybean import.

m) MONITORING AND TESTING

Since Hungary is one of the major seed exporters, genetic purity of seeds is highly important. Plant propagation materials (including seeds) go through sampling and laboratory analyses for the presence of

GE traits. Corn is the most common target of the Government's GE testing efforts. Under the rules, third country seed import lots are subject to mandated testing for GE presence paid for by the importers or distributors. Imported seed lots from other EU member states must be accompanied by a negative GE test from an EU accredited laboratory.

Based on risk analysis, seed lots previously notified by producers or distributors are checked before sowing. Farmers can use only preliminary tested seeds which have been proven as GE-free products. From this aspect, a cornfield can have unintended GE presence only when the existing regulation is violated in Hungary.

In the course of its normal schedule, National Food Chain Safety Office checks about 800 seed lots a year as a part of biotechnology screening program. The official control is both on Hungarian crops and on seeds from the EU and non-EU countries. In 2014, 2.7 percent (mainly sweet corn and rape) of the 845 tested samples had unintended presence of GE traits.

The monitoring and testing are continued in 2015 but summarizing report about the results is not available yet. According to a disclosure of the National Food Chain Safety Office, a corn seed stock was confiscated and ordered for destruction in a value of HUF 10 million (USD $36,500) in April, 2015 because of GE content. Based on the case, the Minister of Agriculture ordered an immediate and extraordinary sweet corn and popcorn seed inspection because the mentioned lots should have been GE-free according to its trade documentation.

n) LOW LEVEL PRESENCE POLICY
In the legislation, Hungary, as a member state of the EU, has a zero tolerance policy for low-level presence of GE products in food and feed shipments. The European Union defined zero with a "technical solution" level of 0.1 percent.

PART C: MARKETING

a) MARKET ACCEPTANCE
Hungarian consumers' attitude to GE products is particularly emotional and influenced by negative campaigns. Verified by political populism, the press published negative opinions many times about GE ingredients of food and feed. The Hungarian Minister of Agriculture stated and published by news agencies in March 2015 that it was important to ensure the availability of non-GE feed for livestock production, and the vast majority of Europeans did not want to see GE food on their plate. He stated that the enormous social rejection of GE products could no longer be ignored in Europe's countries. Even many of the professional papers are filled with similar thoughts and suggest similar approach, following the cited statements.

Proving the preference of non-GE products, demand for GE-free soya in Hungary has constantly been increasing despite the fact that this type was more expensive, official resources said. At the same time, others point out that the choice of Hungarian consumers is price sensitive. However, several surveys tried to prove the increasing health awareness of domestic buyers, other studies considered the price as decisive criterion. Since there is no real alternative to soybeans, which is the main protein source in feeding, its substitution would make food more expensive. Supposedly, it could affect the mostly negative or reserved attitude towards GE products.

b) PUBLIC/PRIVATE OPINIONS

T-TIP negotiations put the GE question in the very center of public attention. It is one of the neuralgic points of the agricultural diplomatic talks. Although there is no intention to dispute the constitutionally banned cultivation of GE plants and Hungary's GE-free status, opposing bodies and political groups often use GE related fears and emotive statements against T-TIP. Press reflects the anti-GE opinions with emotional arguments and repeats generalities. Although the Government of Hungary agrees that T-TIP could be advantageous for the country, their reservations against GE products are often used as propaganda tools by opposing groups of T-TIP.

According to the supporters of the initiative for "GE-free agriculture in Europe", the possible dangers of biotech crops have still not been examined with adequate precision. Long-term assessment of environmental risks, adequate toxicological and allergic studies and feeding experiments are still needed according to this group. Supporters claim that present knowledge is not enough to realistically judge the possible risks of GE products (http://gmo.kormany.hu/en).

It is also worth noting that the Hungarian civil consultant group called, "GMO Round Table" expressed fears and strong criticism and published its position to reject the T-TIP and the instrument of the Investor-Sate Dispute Settlement (ISDS). Their proposal was submitted to the National Assembly of Hungary and it was another proof for that how the GE issues affected the public opinion forming in T-TIP related questions. According to the position paper of the "GMO Round Table" (based on its meeting on March 25, 2015), T-TIP poses a threat to:

- the Hungarian agriculture, environment and food safety,
- the European product authorization and withdrawal practice and its precautionary principles,
- the prudent GE crop authorization system of the European Union,
- the EU's pesticide registration and re-registration rules and measures,
- the food safety standards in the European Union.

The Hungarian Nature Conservation Association and Greenpeace welcomed that the Hungarian Government initiated an alliance of EU countries rejecting the agricultural use of genetically engineered organisms with a view to creating the GE-free European zone. These organizations drew the Agriculture Minister's attention in an open letter to that the transatlantic free trade agreements threaten the country's GE-free status. They were calling for a joint action against the T-TIP and the EU-Canada Comprehensive Economic and Trade Agreement (CETA) in the framework of partnership for GE-free Europe. Based on it, the Hungarian Nature Conservation Association and Greenpeace urged:

- the Government to strongly ensure that the proposals which are undermining the existing level of environmental protection and food safety cannot be part of the ISDS mechanism and the free trade agreement between the EU and the USA;
- a common act within the cooperation of opposed EU member states to GE products against the threat of the transatlantic free trade agreements;
- the rejection of the ratification of the CETA serving a precedent for T-TIP negotiations.

In contrast with the opponent fears, Zoltan Barabas Agricultural Biotechnology Association was founded to represent all branches of agricultural biotechnology, hoping that the negative campaigns and debates on GE crops will ease, and the new breeding techniques and technologies such as the biotechnology can play more important role in the future. Despite the exclusionary efforts, the

Association wishes to enforce the scientifically based view that GE crops could significantly contribute to the crop security in extreme weather situations and to the reduction of CO_2 emission and harmful effects of chemical plant protection. According to the Association's statement, they were unsuccessful in influencing governmental decisions. Nevertheless, their activities could make many of the public realize that a technological transition is going on in the agriculture and food industry, and the ignorance of this fact causes losses for the economy and the society.

The Pannonian Plant Biotechnology Association also supports the regional plant biotechnology research and communication. Their objective is to promote biotechnology contribution to the technological development of sustainable agriculture and provide accurate and science based information about plant genetic engineering.

c) MARKET STUDIES:

According to the Hungarian Ministry of Agriculture, consumers need and are looking for healthy and non-GE food in the market, and a new "non-GMO" label would meet their demands. It is believed that products bearing the "non-GMO" label will be easier to sell because of the better market position. Although the price is still critical in purchase decisions in Hungary, health-conscious buyers represent increasing proportion of consumers. Guarantee of quality protein plants in feeding is also expected from the introduction of the "non-GMO" label and the operation of a strict quality assurance system.

Regarding the most important agricultural crops, Hungary is almost self-sufficient with the exception of soybean. Hungary's climate is mostly suitable for the cultivation of soya, but its growing area is only 1 percent (40-42 thousand hectares) of the total arable lands of the country. Although there is a demand in the market and EU customers would pay premium for non-GE soybean products, soybean cultivation is not profitable enough in Hungary compared to the achievable profits from cereals. In addition, the average soybean yield was 2.2 tons/ha from 2008 to 2013, which was 12% lower than the EU-28 average.

In terms of environmental conditions and crop structure of Hungary, there are potentially 150,000 ha to cultivate soybean with 250-350 thousand tons expected yield annually. Hungary is on the northern boundary of the area where soybean production can be profitable. There are several factors that affect the yield of crops; a proper growing region, correct biotic and abiotic factors, specific agro-technological capabilities and soybean needs 1000-1500 °C effective heat amounts in the vegetation period. Currently, domestic production is about 80 thousand tons of soybeans a year. Consequently, there are opportunities for soybean imports because Hungary and the EU have large deficits in soy.

Generally, the structure of the Hungarian agriculture is not adequate in favor of crop production. That is why short term governmental aim is to the increase the number of livestock. It would be desirable to set a 50-50% ratio between the agricultural subsectors of plant and livestock production. The Hungarian Government strongly supports the increase of the number of pigs from 3 million to 6 million in order to keep the market possibilities domestically and abroad and supply the food industry with raw materials in good quality. It is an announced governmental effort to achieve and maintain GE-free milk, meat and egg production in Hungary. Nevertheless, the main problem is that there is no comparable alternative of soybean as protein source in feeding. Apart from difficulties in the availability of non-GE feed in sufficient quantity and quality, the price of food would be higher by 10-20 percent if GE products were not allowed in animal nutrition.

PART D: CAPACITY BUILDING AND OUTREACH

a) ACTIVITIES

The Office of Agricultural Affairs Budapest has been involved in programs to promote regulatory and market acceptance of GE crops. Activities included cooperation with representatives of U.S. producer groups. The office facilitated the cooperation between the American and Hungarian professionals involved in biotechnology.

Among the Hungarian professionals, Zoltan Barabas Agricultural Biotechnology Association and the Pannonian Plant Biotechnology Association are worth noting as non-government organizations of scientists and companies. They have a significant role in providing the general public with objective scientific and agronomic background information on agricultural biotechnology.

The Pannonian Plant Biotechnology Association was established by scientists, plant breeders, and seed companies from Austria, the Czech Republic, Hungary, Slovakia, Slovenia, Romania, Croatia, Bosnia-Herzegovina, Serbia and Ukraine. This group facilitates collaboration and information exchange on agricultural biotechnology. In 2013 and 2014, the Association regularly held seminars and conferences on plant biotechnology at different universities, giving good forums for objective debates about advances in biotechnology technics. One of their main purposes was to establish relation with scientific and agricultural associations, non-governmental organizations to facilitate science-based plant biotechnology acceptance.

Based on the proposal of the chairman of the Pannonian Plant Biotechnology Association, the mentioned biotech associations were initiated to merge into each other in April, 2015.

Independently of the organizational processes, the Pannonian Plant Biotechnology Workshop will be held on June 8-10, 2015 in Ljubljana (Slovenia), addressed the integration of fundamental research into the practical agriculture.

The Regional Environmental Center for Central and Eastern Europe was also hosting a stakeholder Workshop on Virtual Diagnostic Network and Risk Assessment Tool for Plant Biosecurity on April 22, 2015 on behalf of the project Plant and Food Biosecurity - Network of Excellence.

The Hungarian Biotechnology Association organized another biotech workshop with the tile of "business from science" on March 27, 2015. It was the fourth time that their conference, "dialogue on biotechnology" has been held.

b) STRATEGIES AND NEEDS

- Representation of U.S. agricultural interests in Hungary by advocating for unbiased and science-based enforcement of laws relating to GE crops.
- Cooperation with scientific institutes, governmental and non-governmental bodies and organizations, market and industrial entities which are interested in GE questions.
- Communication development on GE crop production and risk management because the public perception is dependent upon information availability and credibility. Support of regional biotechnology communication to facilitate science-based plant biotechnology acceptance.

- Provide more information about business opportunities and direct and indirect benefits of modern crop production helped by biotechnology achievements.
- Introduction of new biotechnology results to address regional agricultural challenges.

CHAPTER 2: ANIMAL BIOTECHNOLOGY

PART E: PRODUCTION AND TRADE

a) BIOTECHNOLOGY PRODUCT DEVELOPMENT
In Hungary, no commercial use of GE animals for agriculture has been applied for or received. Animal biotechnology technologies are mainly related to livestock breeding, such as embryo transfer and progeny evaluation.

In terms of animal cloning, two research institutes, the Agricultural Biotechnology Center and the Biology Research Center of the Hungarian Academy of Sciences are active in Hungary. The Agricultural Biotechnology Center belongs to the National Agricultural Research and Innovation Center with its research groups such as Applied Embryology and Stem Cell Research Group, Ruminant Genome Biology Group, Rabbit Genome Biology and Bio-model Group. They focus on exploring genome wide polymorphisms with functional importance in ruminants, functional characterization of pluripotent stem cell and on the use of rabbit as model in biotechnological applications participating in the RGB-Net Rabbit Genomic COST Action.

A private "spin off" company, BioTalentum Ltd. has also been founded for providing biotechnology research services. BioTalentum is a leading technology provider in Central and Eastern Europe in the field of development of new transgenic animal models, cellular models and stem cell systems for biomedical research and drug testing. The company's scientific focus is on medical and animal biotechnologies, especially on stem cell research (human, mouse, rabbit induced pluripotent stem cells, embryonic stem cells and cancer stem cells).

b) COMMERCIAL PRODUCTION
Hungary does not produce any livestock clones or GE animals.

c) BIOTECHNOLOGY EXPORTS
Hungary does not export GE animals or livestock clones.

d) BIOTECHNOLOGY IMPORTS
Currently, no legislation regulates the imports of semen or embryo from clones. Hungary imports about USD 2-3 million worth of Holstein bull semen from the USA annually.

PART F: POLICY

a) REGULATION

All kinds of genetic engineering are regulated by the Act No. XXVII of 1998 on Biotechnology Activities. The competent authority for animal biotechnology is the same as for plant biotechnology. The administrative body which receives and evaluates the GE applications for animal biotechnology experiments is the Gene Technology Committee.

Hungary has no country-level legislation or regulations related to the commercial use and trade of clones or products derived from clones. The Hungarian Government supports the EU efforts to create common EU legislation and institutions governing animal cloning. Hungary is still a vocal opponent of any kind of GE plant or animal products.

b) LABELING AND TRACEABILITY
Hungary does not produce and trade any livestock clones or GE animals. Laboratory animals used in animal biotechnology experiments are not released. Therefore, labeling and traceability is not an issue in Hungary.

c) TRADE BARRIERS: N/A

d) INTELLECTUAL PROPERTY RIGHTS
Similarly to plant genetics, Hungary is against the patents on animal genetic materials. There is no specialized intellectual property legislation for GE products.

e) INTERNATIONAL TREATIES/FORA
Hungary actively participates in the work of several multilateral and intergovernmental organizations such as FAO, WTO, OIE and Codex Alimentarius related to animal health and food safety issues.

PART G: MARKETING

a) MARKET ACCEPTANCE
Similarly to GE crops, animal products connected with cloning and genetic engineering are likely to experience rejection by the Hungarian consumers and food marketing chains.

b) PUBLIC/PRIVATE OPINIONS
The Hungarian public is quite critical of products coming from advanced production technologies. Among the Hungarians, animal cloning and food products made from cloned animals are unpopular and trigger concerns and incomprehension. According to a former study of Corvinus University (Faculty of Food Science, 2007) on consumer acceptation, 67.3% of the total population rejected the use of clone technology, while the rate of supporters was only 10.0%. A Eurobarometer's research reached similar conclusions in 2008, dealing with this question. Based on the results, Hungarian population is more skeptical than the EU average concerning the usefulness and necessity of food made from cloned animals. Regarding the animal biotechnology which is used for medical purposes, the public opinion is quite positive.

c) MARKET STUDIES
Although several biotechnology companies, university knowledge centers, and bio-incubators deal with research on GE animals in Hungary, market surveys on these topics are not available. Biotech companies could gain ground mainly in the market of veterinary molecular diagnostics and marker-

assisted selection.

PART H: CAPACITY BUILDING AND OUTREACH

a) ACTIVITIES
Agricultural Office has personal contacts with leading representatives of academic institutions and animal breeding associations involved in animal biotechnology and cloning.

b) STRATEGIES AND NEEDS
Maintain the cooperation with scientific institutes, governmental and non-governmental bodies and organizations, market and industrial entities which are interested in animal biotechnology.